

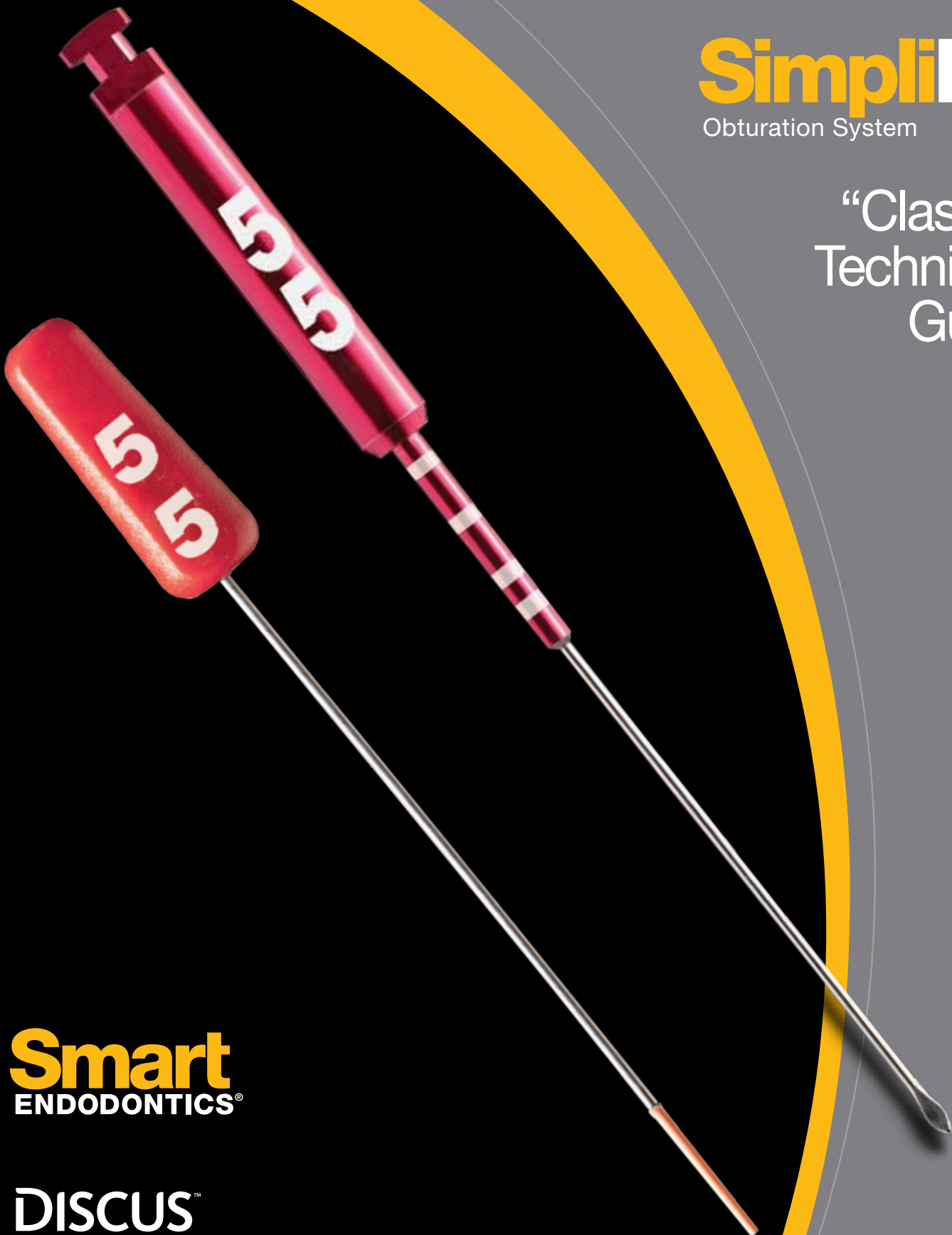
LightSpeed[®]

NiTi Rotary Instrumentation System

SimpliFill[®]

Obturation System

“Classic”
Technique
Guide



Smart
ENDODONTICS[®]

DISCUS[™]

Recommended Armamentarium

Designed with precision and convenience in mind, these accessories simplify the case for both you and your assistants. Discus Dental recommends the following items to complement the LightSpeed® and SimpliFill® techniques:



EndoPAL Cordless Handpiece

Operating at 2500 rpm, the EndoPAL runs at the ideal speed and torque for LightSpeedCRX™ and LightSpeedLSX™, and has a simple “ON-and-OFF” operation. Use two or more EndoPALs together to reduce chair time.



SimpliSeal® Root Canal Sealer

This epoxy-based resin sealer features excellent handling characteristics, outstanding chemical and physical properties and biocompatibility.



HotShot® Cordless Backfill Obturation Device

The HotShot is a convenient device to backfill the remainder of the canal after sealing the apical third with a SimpliFill Apical Plug™. It features both 360° swivel and non-swivel needles in a variety of lengths ranging from 20 – 50 mm. Whether you’re using gutta-percha or Resilon®, the variable temperature settings allow you to control obturation flow characteristics.



LSX Organizer Box

Features an instrument usage tracker and length measuring gauges for both right- and left-handed operation. It is autoclavable with the instruments and sponge still inside. Instruments sold separately.



Retrieval Micro Forceps

Available in 3 angles (45°, 75° and 90°) to address different teeth and canals, these forceps are the ideal instrument for retrieving separated LSX instruments.



HotTip™ Cordless Warm Vertical Compaction Device

The HotTip is an excellent tool for eliminating voids during backfill. It can also be used to trim GP points and fill the apical third when using warm vertical obturation techniques.



SimpliFill Organizer Box

This handy, clear plastic case keeps an assortment of SimpliFill plugs in one convenient location. It holds up to 24 plugs and is sold empty.



EndoPax™ Hand Pluggers

Finished with a special GTX coating, EndoPax pluggers are used to pack both gutta-percha and Resilon obturation materials.

Tips & Precautions

LightSpeed

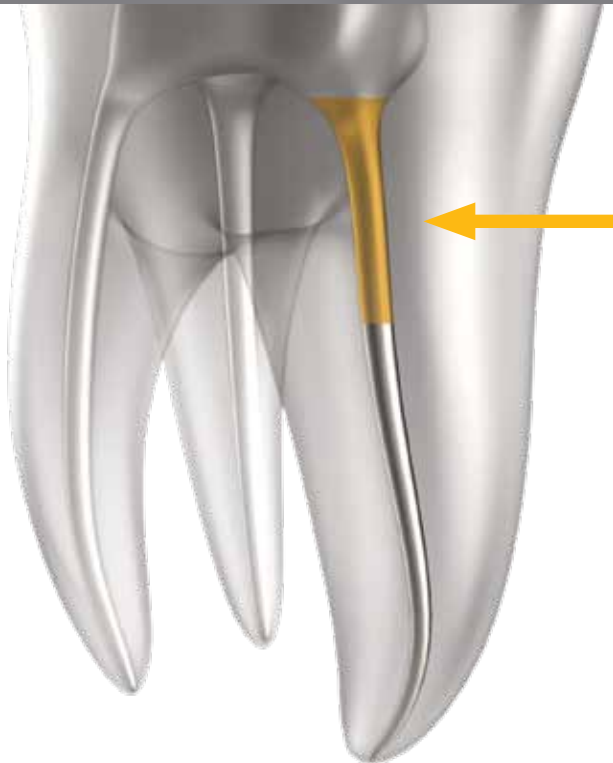
- Do not push LSX hard or fast. This could cause it to buckle and break.
- Do not instrument in a dry or semi-dry canal. Instead, instrument with NaOCl or liquid EDTA in the canal. EDTA in paste form is not recommended.
- Do not exceed 3000 rpm or go below 2000 rpm with CRX and LSX. 2500 rpm is the ideal speed.
- Do not overuse LSX instruments. Dispose after no more than 4 uses and use only once in severely-curved canals.
- Do not use CRX or LSX without a rubber dam.
- Do not use instruments without sterilizing first.
- Only steam autoclaving is recommended for sterilization of LightSpeedCRX and LSX instruments and the associated metal organizers at temperatures between 120°C - 130°C for 60 minutes at 15 PSI.
- Ultrasonic cleaning should be limited to very mild detergents.
- Do not use Rotasept or similar products, particularly those containing potassium hydroxide or similar harsh chemicals as they may lead to stripping of the color from the aluminum surfaces. High heat sterilization can also cause color fading. It is best to test cleaning and sterilization protocols on a small sample before proceeding.

SimpliFill

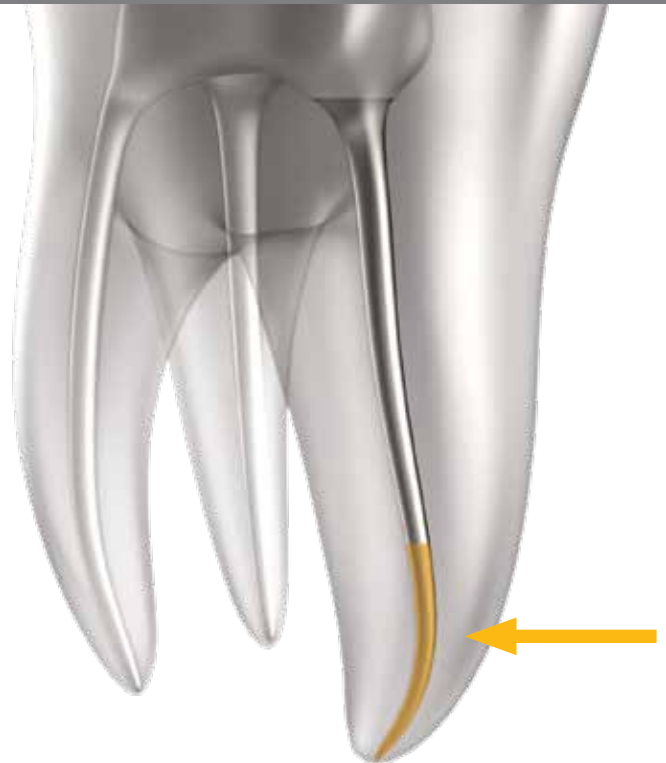
- Sterilize the Apical Plug by submerging the Carrier and Plug in sodium hypochlorite for at least one minute.
- Use SimpliFill Plugs and carriers only once. Discard carriers properly in a SHARPS' type container.
- Do not advance the SimpliFill Plug beyond the point of a slight snugness when trial fitting. Doing so may leave it in the canal prematurely.
- Do not use SimpliFill if the canal is not properly prepared for it.
- Do not sterilize the Plug and Carrier with heat.
- Do not rotate the Carrier handle before the Plug has reached WL. After reaching WL rotate the Carrier counter-clockwise to release the Plug.
- Do not use SimpliFill without a rubber dam.

Basic Technique Guide

1 Access and Coronal Instrumentation



2 Apical Instrumentation



- Crown access, locate canals
- Anti-curvature filing with hedstrom files #15, #20, #25
- Coronal flaring – CRX #2
- Determine WL – K-file #15
- Patency to WL – K-file #20

NOTE: Instrument sizes will vary based on the anatomy of the canal being instrumented

- LSX – all to WL

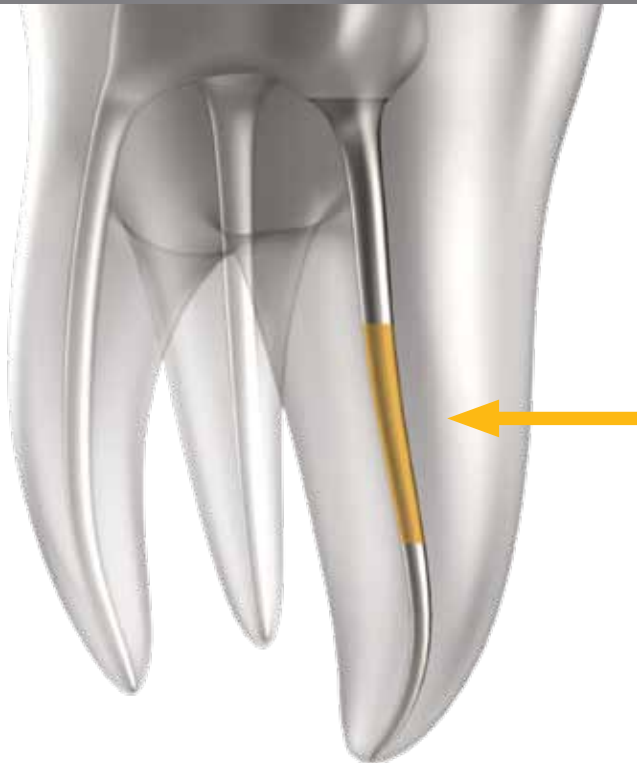
- #20
- #25
- #30
- #35
- #40

Slowly advance to resistance, pause, slowly advance to WL.

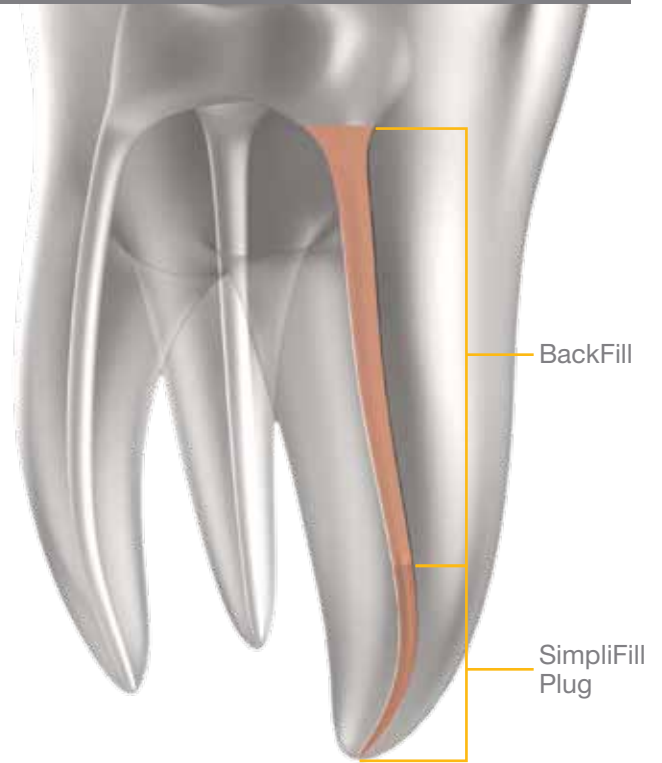
- #45 (FAS = Final Apical Size)

- LSX #50 to WL minus 4 mm
- Irrigate between every instrument that cuts dentin
- EndoPAL – 2500 rpm

3 Mid-Root Instrumentation



4 Obturation



- LSX (approximate depths)
 - #55 to WL – 5 mm
 - #60 to WL – 6 mm
 - #65 to WL – 7 mm
- Recapitulate to WL with FAS = LSX #45

- Sealer – SimpliSeal
- SimpliFill Apical Plug #45 to WL
- HotShot – backfill to orifice
- EndoPax – condense

- FAS – LSX #45
- Final irrigation
 - EndoVac MacroCannula – NaOCl
 - EndoVac MicroCannula – NaOCl & EDTA
 - Dry canal

LightSpeed Overview

OVERVIEW OF LSX INSTRUMENTATION

- Clean the apical third and middle of the root canal by preparing each canal to its biologically optimal Working Width
- Shape the canal for EndoVac® irrigation
- Shape the canal to accept a SimpliFill® Apical Plug

LSX FINAL APICAL SIZING (FAS) GUIDE

One thing that sets Smart Endodontics apart is knowing when to stop your apical preparation. Due to the unique design of LSX (its short cutting blade and flexible shaft) knowing when to stop (neither under- nor over-preparing the canal) has become much more scientific.

LSX Final Apical Sizes may appear to be very “big” to those unfamiliar with this technique. Keep in mind that our goal is to customize each and every root canal preparation to the correct size. By cross sectioning thousands of extracted teeth, we know that when the proper technique is followed, the end result is a beautifully round preparation (clean) with plenty of dentin still remaining around the canal (see photo).

Determining the FAS becomes intuitive with experience. The FAS defines the Working Width (WW). It is the instrument size that is slightly larger than the original apical canal diameter. The FAS mechanically scrapes the apical canal walls clean while EndoVac irrigation removes debris from the canal.

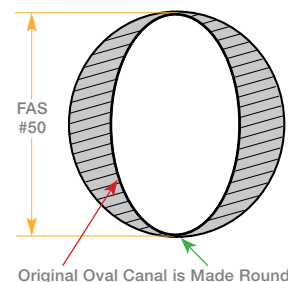
*Also called the Master Apical File (MAF) or Master Apical Rotary (MAR)

We surveyed experienced LSX users for their Final Apical Sizes from recently completed cases. Both Endodontists and General Dentists participated and approximately 2500 Final Apical Sizes* were collected:

Most Common Final Apical Sizes (FAS)

MAXILLARY		
Tooth Name	Final Apical Size (Most Common)	Final Apical Size (Range)
Central	80	50 - 140
Lateral	70	50 - 130
Canine	80	55 - 120
Premolar	50, 60	35 - 110
Molar - MB	55	35 - 110
Molar - DB	60	35 - 90
Molar - P	70	40 - 120
MANDIBULAR		
Tooth Name	Final Apical Size (Most Common)	Final Apical Size (Range)
Incisor	60	60 - 80
Canine	70	70 - 110
Premolar	45, 70	40 - 100
Molar - MB	55	35 - 110
Molar - ML	55	35 - 90
Molar - P	70	35 - 120

*Data on file, Discus Dental, LLC 2008



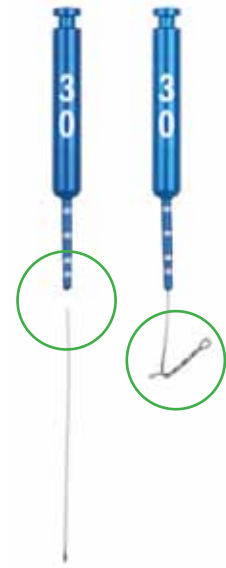
Original Oval Canal is Made Round

SAFETY RELEASE

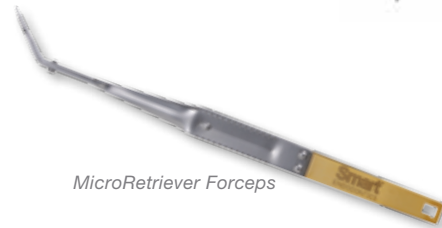
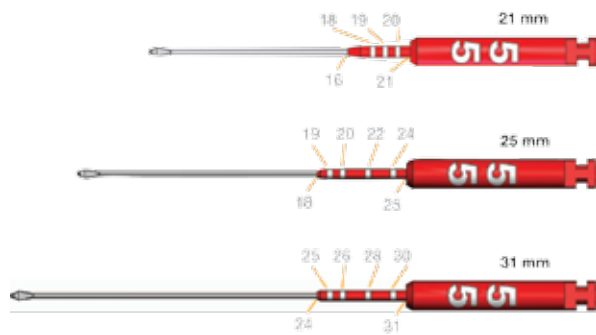
When overstressed, LSX instruments are designed to twist-up or pull loose from the handle. This may occur when the instrument:

- Is pushed too forcefully, causing it to buckle
- Is pushed too rapidly
- Encounters unusual anatomy
- Encounters inadequate StraightLine Access

If safety release occurs, the fragment usually is easily removed with MicroRetriever Forceps. If the fragment cannot be removed, try bypassing it with K-type files.



LENGTH RING GUIDE



MicroRetriever Forceps

LSX Technique Guideline

With the handpiece rotating at 2500 rpm, enter the canal and slowly advance the LSX apically. If there is no resistance (common with smaller sizes) keep advancing to WL. If there is resistance (blade engages walls), pause for a moment, and then advance to WL with a slow, continuous pushing motion. Sometimes an LSX will not advance to WL because of a sharp curve (usually at the very end of the canal). Instead of using force, take the LSX out of the handpiece and try it by hand (see Hand Instrumentation at right). In very rare instances, a #25 or #30 K-file is required to smooth out the curve.

Hand Instrumentation with LSX

Use a continuous clockwise (or counterclockwise) motion while applying firm apical pressure. Remove the instrument periodically to clean the blade and irrigate the canal. Continue with sequentially larger LSX instruments until the canal is enlarged enough with hand instrumentation to allow the next larger LSX to advance to WL while rotating in the handpiece.

LightSpeed Detailed Technique Guide

PHASE 1: Create Straight-Line Access, Determine Working Length (WL) and Obtain Canal Patency to WL

Step 1: Access and Coronal Flaring

Make access through crown and achieve straight-line access to mid-canal. See Straight-Line Access Technique Guide for details.

As an alternative to Gates Glidden Drills or Orifice Shapers, select the CRX instrument whose tip fits slightly into the orifice opening. Begin rotation of the handpiece at 2500 rpm before entering the orifice. Slowly advance CRX into the canal orifice and continue cutting deeper into the canal. Ideally, this is accomplished with just one or possibly two CRX instruments. Upon reaching this depth, complete the process by smoothing the sides of the orifice with a gentle up and down motion while leaning the instrument against the wall with a lateral “brushing” motion. Coronal shaping is complete when reaching ~4 mm deep into the canal.

Caution: If the CRX does not easily advance, do not force it, instead, try the next SMALLER CRX instrument.

Step 2: Determine Working Length

An electronic foramen locator is highly encouraged.

Step 3: Obtain Canal Patency

Enlarge the canal with a series of hand k-type files until a #20 K-file fits loosely to WL. Do not begin instrumentation with LSX until a #20 k-file can be easily advanced to WL.

PHASE 2: Apical and Mid-Root Preparation with LightSpeedLSX

Step 1: Begin Instrumenting the Apical Part of the Canal

Begin with the LSX #20. Begin handpiece rotation, ~2500 rpm, before entering the canal. If #20 does not go easily to WL, further enlarge canal with #25 K-file and continue instrumenting with hand files until the LSX glides easily to WL.

Step 2: Continue Instrumenting the Apical Part of the Canal

Continue with sequentially larger LSX sizes, each going to WL. Slowly advance the instrument into the canal. At the first sign of resistance, pause and note how far the tip is from reaching WL. After pausing for one or two seconds, continue advancing the instrument apically until reaching WL. Repeat with the next larger instrument.

Note: Irrigate after every LSX instrument that cuts dentin. Use NaOCl and the liquid (not paste) form of EDTA.



Step 3: Determine the Final Apical Size (FAS)

As you progress to larger LSX sizes, resistance will be felt further and further from WL. The first LSX to encounter resistance 4mm (or more) from WL may be the Final Apical Size (FAS). If it takes a firm push to reach WL once resistance is felt, this is the FAS. If in doubt, go on to the next larger size.



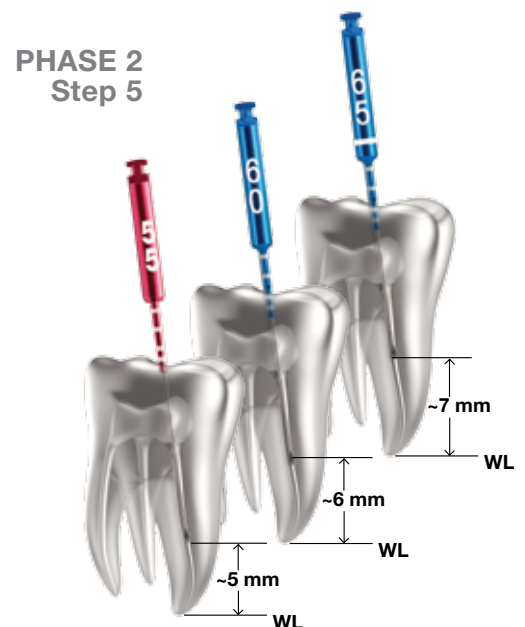
Step 4: Complete Apical Shaping, Create Ramp for SimpliFill

With the very next larger instrument in the LSX sequence (after the FAS), instrument 4 mm short of WL. This shapes the canal to accept the SimpliFill Apical Plug used for obturation.



Step 5: Instrument Mid-Root

Instrument the remaining mid-root with sequentially larger LSX instruments. Advance to resistance, pause, then push 2 to 3 mm apically. BE CAREFUL NOT to advance any mid-root instrument to within 5 mm of WL as this may result in a loose fitting SimpliFill Plug. Repeat this step until reaching a size that will not easily advance past the coronal third of the canal. Mid-root instrumentation usually requires 3 instruments.



Step 6: Recapitulate to WL

Rotating in the handpiece, advance the FAS instrument to WL to confirm that the canal is ready for obturation. The FAS should advance easily to WL without encountering any obstructions. Note the final WL.

Then, stop the handpiece rotation and by hand, confirm the existence of an apical stop by attempting to push the FAS past the WL. The FAS should not advance past WL. **DO NOT ATTEMPT THIS WITH THE INSTRUMENT ROTATING IN THE HANDPIECE AS THIS CAN LEAD TO AN APICAL PERFORATION.**

Step 7: Final Irrigation (See EndoVac Irrigation Technique Guide)

Begin with the MacroCannula to remove the gross debris, then irrigate apically with NaOCl using the MicroCannula. Irrigate a second time with liquid (not paste) EDTA, suction and dry. Irrigate a third time with NaOCl. Dry canal with paper points. Once you have confirmed that the canal is clean and free of debris, the canal is ready for obturation.

PHASE 3: Obturation with SimpliFill

PRIOR TO USING SIMPLIFILL be sure that:

- (1) the apical preparation was done correctly
- (2) the canal is dry and free of debris

When first learning SimpliFill, it is a good idea to trial fit. With experience, most SimpliFill users skip the trial fitting step.

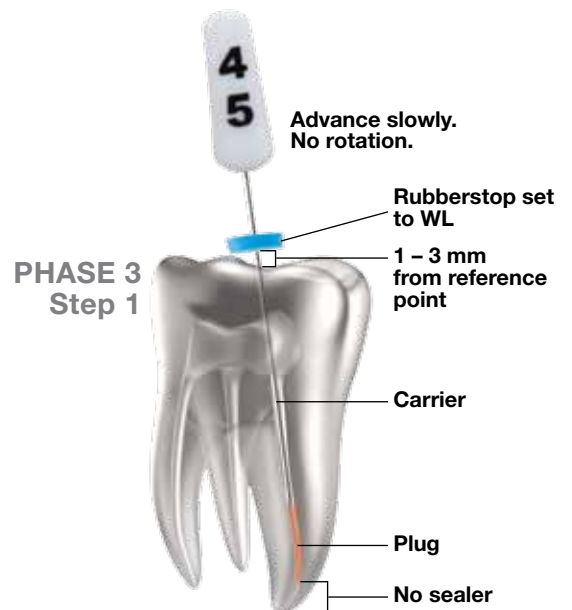
Step 1: Trial Fitting

The purpose of trial fitting is to check that the SimpliFill Plug will fit the apical preparation correctly. Do not use sealer while trial fitting.

Select a SimpliFill Plug (the same size as the FAS) and set its rubber stop to WL. Enter the canal, and without rotation, slowly and gently advance the Carrier. Stop advancing immediately when feeling a slight snugness of the Plug. Note how far the rubber stop is from the reference point. If the stop is 1 to 3 mm short of the reference point (WL), the fit is correct. If the stop is less than 1 mm refer to A below. If the stop is more than 3 mm from the reference point, refer to B below.

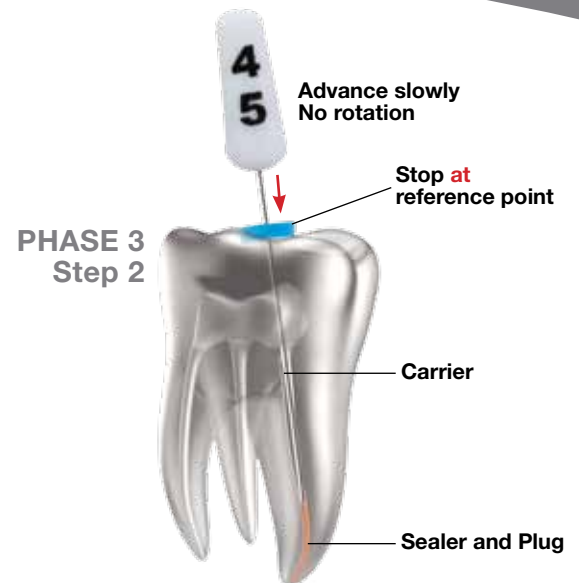
- A. If the stop is less than 1 mm from the reference point, it means the Plug is too small for the preparation. Cut 1 mm from the tip or try the next larger size SimpliFill.
- B. If the stop is more than 3 mm from the reference point, it means the Plug is too large for the preparation. Try the next smaller size Plug.

Caution: Advancing beyond a slight snugness or rotating the Carrier may leave the Plug prematurely in the canal (Plug is easily removed with a Hedstrom file or the LSX FAS).



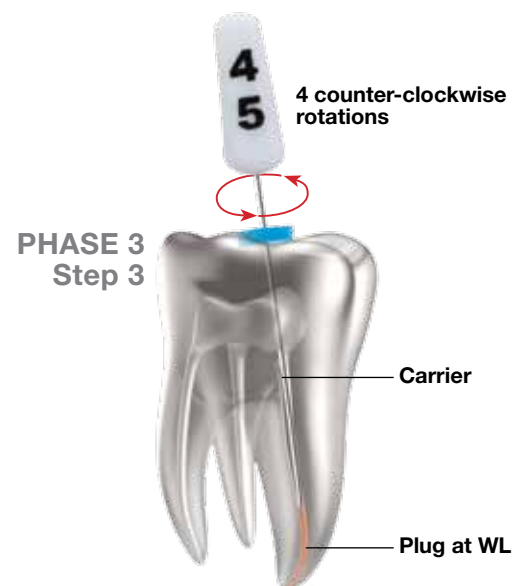
Step 2: Place SimpliFill Plug (permanently) to WL

Coat the canal walls and the Plug itself with sealer. Enter the canal and slowly advance the SimpliFill until the rubber stop is at the reference point (tip of Plug is at WL). Placing the Plug to WL should require a firm push. If the Plug doesn't reach WL, it means the Plug is too large for the preparation, try using the next smaller size Plug.



Step 3: Release Plug from Carrier

When the Plug is at WL (not before), turn the handle at least 4 complete counter-clockwise rotations to release the Plug from the Carrier. Obturation is now complete if a post will be used. Note: If Plug does not release from Carrier, the Plug is too small to adequately seal the canal. Cut 1 mm from the tip or use the next larger size Plug.



Step 4: Backfill Remainder of Canal

Use the HotShot gun to fill the remainder of the canal. Backfill in 2-4 mm increments and use the EndoPax Pluggers to condense each layer. Repeat adding backfill layers until reaching the orifice. Any voids in the backfill can be easily removed with the HotTip. See HotShot and HotTip directions for use for technique details.





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